



INSTITUTE OF AERONAUTICAL ENGINEERING

Dundigal, Hyderabad - 500 043
Power Electronics and Electric Drives

QUESTION BANK

Course Name	:	Flexible AC Transmission Systems
Course Code	:	B2203
Class	:	M TECH II-SEM
Branch	:	Power Electronics and Electric Drives
Year	:	2017-2018
Course Co-Ordinator	:	Mr. P. SRIDHAR
Course Faculty	:	Mr. P.SRIHDAR

OBJECTIVE:

S. No	Question	Blooms Taxonomy Level	Course outcome
UNIT – I			
FACTS CONCEPTS			
1	How the reactive power is controlled in FACTS devices?	Remember	1
2	What is meant by Thyristor switched series capacitor	Remember	1
3	What are the different types of compensation schemes	Remember	1
4	Distinguish between load compensation and system compensation	Remember	1
5	What is the need of reactive power control in electrical power transmission lines?	Remember	1
6	Draw the one line diagram of static synchronous series compensator	Remember	1
7	Write the formula for surge impedance of transmission system	Remember	1
8	Draw the circuit diagram and waveform of basic relationships for power flow control	Remember	1
9	What is mean by dynamic stability considerations of FACTS controllers	Remember	1
10	What are the benefits from FACTS controllers	Remember	1
LONG QUESTIONS			
1	Describe briefly the load and system compensation schemes.	Understand	2
2	Explain dynamic stability considerations of FACTS controllers		
3	Explain the principle, working and characteristics of static VAR compensator with a neat circuit diagram	Analyze	2
4	Explain the working and characteristics of Thyristor switched series capacitor with a neat diagram.	Analyze	2
5	Explain importance of controllable parameters basic types of FACTS controllers	Understand	2
6	Explain transmission inter connections power flow in an AC system	Analyze	2
7	Explain loading capability limits, dynamic stability	Apply	2

	considerations of FACTS controllers		
8	Explain the reactive power compensation at the sending, mid-point and receiving ends of the transmission lines.	Understand	2
9	Explain loading capability limits of FACTS controllers	Understand	2
10	Explain with neat circuit diagram about fixed capacitor-Thyristor controlled reactor	Analyze	2
UNIT – II VOLTAGE SOURCE CONVERTERS			
1	Define voltage stability	Remember	2
2	State the advantages of linear operating characteristics of compensator	Remember	2
3	What is the comparison of current source converters with voltage source converters	Remember	2
4	State the advantages of slope in SVC dynamic characteristics	Remember	2
5	What are the different power electronic switching devices?	Remember	2
6	Define the term Static VAR Compensator	Remember	2
7	Write basic concept of current source converters	Remember	2
8	Write any two applications of synchronous condensers	Remember	2
9	Draw the operating characteristics of SR compensator	Remember	2
10	What is mean by pulse width modulation converter	Remember	2
LONG QUESTIONS			
1	Explain the design of SVC voltage regulator. Also discuss the influence of SVC on system voltage	Apply	2
2	Discuss in detail the effect of SVC for the enhancement of transient stability	Understand	2
3	Using a general schematic diagram, explain the three basic modes of SVC control in detail	Understand	2
4	Explain the application of SVC for prevention of voltage instability.	Understand	2
5	Explain Single phase and three phase full wave bridge converters transformer connections for 12 pulse 24 and 48 pulse operation.	Understand	2
5	How do you enhance the damping in power system using SVC	Understand	2
6	Explain the design of SVC voltage regulator and discuss the voltage control capability of SVC. What are the advantages of slope in dynamic characteristics of SVC?	Analyze	2
7	Discuss in detail about the role of SVC in improving the stability limit and enhancing the power system damping	Understand	2
8	Describe the construction and operating characteristics of synchronous condensers.	Understand	2
9	Derive and explain the series and shunt compensation of symmetrical transmission lines.	Analyze	2
UNIT – III STATIC SHUNT COMPENSATION			
1	What is objective of shunt compensation	Remember	3
2	What is mean by midpoint voltage regulation of Static shunt compensation:	Remember	3

3	What are the improvement of transient stability of Static shunt compensation	Remember	3
4	Write two points on power oscillation damping. Write any two locations in which the SVCs are placed in the transmission system	Remember	3
5	Methods of controllable VAR generation,	Remember	3
6	Define variable impedance type static VAR generator	Remember	3
7	What is the function of switching converter type VAR generator	Remember	3
8	Write notes on hybrid VAR generator	Remember	3
9	How voltage instability prevention in Static shunt compensation	Remember	3
10	Draw the block diagram of non linear gain in the SVC voltage regulator	Remember	3
LONG QUESTIONS			
1	Explain objective of shunt compensation	Understand	3
2	Explain midpoint voltage regulation of Static shunt compensation:	Understand	3
3	Explain improvement of transient stability of Static shunt compensation	Analyze	3
4	Explain power oscillation damping of Static shunt compensation	Understand	3
5	Explain Methods of controllable VAR generation,	Analyze	3
6	Explain variable impedance type static VAR generator	Understand	3
7	Explain switching converter type VAR generator	Understand	3
8	Explain hybrid VAR generator	Understand	3
9	Explain voltage instability prevention in Static shunt compensation	Understand	3
10	Explain the controller interactions between multiple SVCs (SVC-SVC) in a large power system	Analyze	3
UNIT – IV SVC AND STATCOM			
1	What is the function of STATCOM?	Remember	4
2	Draw the phasor diagram illustrating the power flow control capabilities of UPFC	Remember	4
3	What is IPFC?	Remember	4
4	Write the significance of sub synchronous resonance	Remember	4
5	State the salient features of UPFC	Remember	4
6	Write any two assumptions made during the modeling of harmonic performance of SVC.	Remember	4
7	Draw the block diagram of non linear gain in the SVC voltage regulator	Remember	4
8	What are the dynamic performance of STATCOM	Remember	4
9	How do you understand damping operating point control of SVC	Remember	4
10	Write any two points on regulation and slope transfer function of SVC and STATCOM	Remember	4
LONG QUESTIONS			
1	Explain the working of STATCOM with a neat sketch. In what way it differs from SVC?	Analze	4

2	Explain the operation of STATCOM with its V-I characteristics	Understand	4
3	Explain the performance of VSC based STATCOM.	Analyze	4
4	Describe the modeling of UPFC for power flow and transient stability studies	Understand	4
5	Explain the basic principle and control capability of unified power flow controller.	Apply	4
6	Explain the power transfer capability of UPFC and compare its capabilities with other FACTS controllers	Understand	4
7	Describe the construction of UPFC with a block diagram and its characteristics with phasor diagrams.	Apply	4
8	Explain the power flow control and oscillation damping in the two area system using UPFC.	Understand	4
9	With a neat sketch, explain the implementation of UPFC.	Apply	4
10	Explain regulation and slope transfer function of STATCOM	Understand	4
UNIT- V			
STATIC SERIES COMPENSATORS			
1	What is the need of variable series compensation	Remember	5
2	Draw the schematic representation of TCSC	Remember	5
3	What are the different modes of operation of TCSC?	Remember	5
4	How to model of TCSC?	Remember	5
5	What are the applications of TCSC?	Remember	5
6	Draw the V-I characteristics of TCSC	Remember	5
7	Define line commutation	Remember	5
8	Draw the controlled characteristics of Thyristor controlled reactor.	Remember	5
9	Define TSSC	Remember	5
10	What is the function of GSC	Remember	5
LONG QUESTIONS			
1	Explain the principle of operation of TCSC. Also discuss the different modes of TCSC	Understand	5
2	Explain the effect of TCSC for the enhancement of system damping	Analyze	5
3	Describe the variable reactance model of TCSC	Understand	5
4	Explain the different modes of operation of TCSC.	Understand	5
5	Describe the modeling of TCSC for load flow study.	Apply	5
6	Explain the working, characteristics and operating modes of variable reactance model of thyristor controlled series capacitor	Analyze	5
7	Explain in detail the applications of thyristor controlled series capacitor	Analyze	5
8	How TCSC is used for the improvement of the stability of a system	Apply	5
9	Explain power oscillation damping and functional requirements of GTO thyristor controlled series capacitor (GSC)	Apply	5
10	Explain power oscillation damping and functional requirements of thyristor switched series capacitor (TSSC)	Apply	5

PREPARED BY: Mr. P. SRIDHAR, Professor, EEE

HOD, EEE